

# Work Order ID 66853



Page 1

Tuesday, March 01, 2011 7:44:41 AM

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Item Name: Crosstube Low Standard Fwd

Stop



Start Date: 3/1/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 3/4/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

*M*

Date: 11-03-01

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start



Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev B

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

*DP*

11-2-28

*PTO*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-107 PAR #: \_\_\_\_\_ Fault Category: X-tubes NCR: Yes No DQA: ✓ Date: 11-03-08  
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: ✓ Date: 11-03-08

NCR: <u>66853</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>11-3-1</u>	<u>120</u>	<u>Tube brake white</u> <u>Bonding</u> <u>Re. process</u>	<u>U</u> <u>11/03/04</u>	<u>Scrap tube</u> <u>RC; Process</u>	<u>[Signature]</u> <u>11-3-1</u>	<u>BE</u> <u>11/03/04</u>	<u>U</u> <u>11/03/04</u>	<u>S</u> <u>11/03/04</u>

NOTE: Date & initial all entries

**Work Order ID 66853**

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Item ID: D212-664-107

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Reference:

Cust Item ID:



Customer:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130  QC Quality Control	QC15- Crosstube Dimensional Check  Memo	0.00  0.00							
140  Crosstubes Crosstubes	Crosstubes  Memo 1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square*** 2-Position cuffs on tube ensure proper positioning 3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10 4-Transfer drill rivet holes from cuff into tube. 5-Identify cuff position and Batch # on each. 6- Inspect surface damage 7- Deburr and realodine cuff.	0.00  0.00							

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Required Date: 3/4/2011 Req'd Qty: 1.00



Customer:

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150  HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion  Memo	0.00  0.00				_____	_____	_____	_____
160  QC Quality Control	QC3- Inspect Part Finish  Memo	0.00  0.00				_____	_____	_____	_____
170  QC Quality Control	QC5- Inspect part completeness to step on W/O  Memo	0.00  0.00				_____	_____	_____	_____

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	<b>Memo</b>	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: _____ LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190 	Packaging	0.00							
Packaging	<b>Memo</b>	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
200 	QC5- Inspect part completeness to step on W/O	0.00							
QC	<b>Memo</b>	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D212-664-107								

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

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Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff  
A/R SIKAFLEX -241/-291 BATCH: \_\_\_\_\_

220

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: \_\_\_\_\_

Fininsh Time: \_\_\_\_\_

PAINT:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Reference:

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Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

230

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

240

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with magnobond 6398 per dwg D212-664-147, cure for 12hrs before packaging.

Time &amp; date of application: \_\_\_\_\_

Batch: \_\_\_\_\_

EXP. DATE \_\_\_\_\_

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**NOTE:** Date & initial all entries

## A standard linear barcode consisting of vertical black bars of varying widths on a white background.

Page 7

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**Setup Start**[illegible]

**Stop**

**Cust Item ID:**[illegible]

**Customer:**

**Reference:**

Run Start

\_\_\_\_\_

**Stop**

[illegible]

**Insp.  
Stamp**

0.00

**Abstract**

QC

## Memo

0.00

## Quality Control

255

## Pick Kit

0.00

[illegible]

### Packaging

## Memo

0.00

## Packaging

260

QC4- 100% Inspect kits for completeness

0.00

**Abstract**

QC

## Memo

0.00

## Quality Control

W/O:		WORK ORDER CHANGES					
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270		0.00							
	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-107								
280		0.00							
	QC21- Final Inspection - Work Order Release								
QC	Memo	0.00							
Quality Control									

ME  
11-03-07

W/O:		WORK ORDER CHANGES					
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# Picklist Print

Tuesday, March 01, 2011 7:44:47 AM

Work Order ID: 66853



Parent Item: D212-664-107



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 3/1/2011

Required Date: 3/4/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM  
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC  
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D  
 10.05.27 added pick kit DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN 		Manufactured	No			140	Each	0.0000	1	1			
Crosstube Turning Detail													
D3659-1 		Manufactured	No			220	Each	5.0000	2	2			
CUFF													
<div> <div>Location</div> <div>ST477</div> <div>50691</div> <div>62475</div> </div> <div> <div>Loc Qty</div> <div>5</div> <div>1</div> <div>4</div> </div> <div> <div>Loc Code</div> <div></div> <div></div> <div></div> </div>													
CR3212-4-06 		Purchased	No			240	Each	1,156.000	44	44			
CHERRY RIVET													
<div> <div>Location</div> <div>ST311</div> <div>112492</div> <div>112724</div> <div>112794</div> </div> <div> <div>Loc Qty</div> <div>1156</div> <div>156</div> <div>200</div> <div>800</div> </div> <div> <div>Loc Code</div> <div></div> <div></div> <div></div> <div></div> </div>													

B50697



①

DP 11-3-1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured

No

240

Each

60.3390

4

4



RUBBER CUSHION

Location

Loc Qty

Loc Code

LG

51.33897368

53775

5.97897368

58161

3.56

59580

0.12

61465

4.68

63960

10

65656

27

ST415

9

64171

8

64300

1

MS21920-25

Purchased

No

240

Each

112.0000

4

4



Clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

83

113281

0

114759

5

114901

3

115278

1

115849

24

116264

50

ST451

29

109181

5

113281

5

113282

18

113744

1

Tuesday, March 01, 2011 7:44:48 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Tuesday, March 01, 2011 7:44:48 AM

Page 3

Work Order ID: 66853

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 3/1/2011

Required Date: 3/4/2011

Start Qty: 1.00

Required Qty: 1.00

D2893-1 Manufactured No 240 Each 15.0000 2 2



2.75 Support

Location Loc Qty Loc Code

LG 15  
63367 15

D3428-1 Manufactured No 260 Each 21.0000 1 1



Placard

Location Loc Qty Loc Code

ST053 12  
66115 12  
ST056 9  
63978 9

AN6-35A Purchased No 260 Each 90.0000 4 4



BOLT

Location Loc Qty Loc Code

ST343 90  
115742 40  
116528 50

AN6-36A Purchased No 260 Each 90.0000 4 4



Bolt

Location Loc Qty Loc Code

ST343 90  
115698 30  
115835 10  
116400 20  
117010 30

Tuesday, March 01, 2011 7:44:48 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Tuesday, March 01, 2011 7:44:48 AM

Work Order ID: 66853



Parent Item: D212-664-107



Parent Item Name: Crosstube Low Standard Fwd

Start Date: 3/1/2011

Required Date: 3/4/2011

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

260

Each

255.0000

6

6



Nut

Location

Loc Qty

Loc Code

ST300

255

111578

4

114495

1

116102

50

116373

100

116548

100

AN960JD616

NAS1149D0663J

Purchased

No

260

Each

0.0000

18

18



Washer

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries



Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6019-128  
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)  
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD  
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%  
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.  
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE  
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS  
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF  
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.  
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

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SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 66853  
PL 1103-1

**RELEASED**  
2009-10-29

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>Q</i>	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>Q</i>	DRAWING NO.	REV. B
MFG. APPR.	<i>Q</i>	D212-664-147	SHEET 1 OF 4
APPROVED	<i>Q</i>	TITLE	SCALE
DE APPR.	<i>Q</i>	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

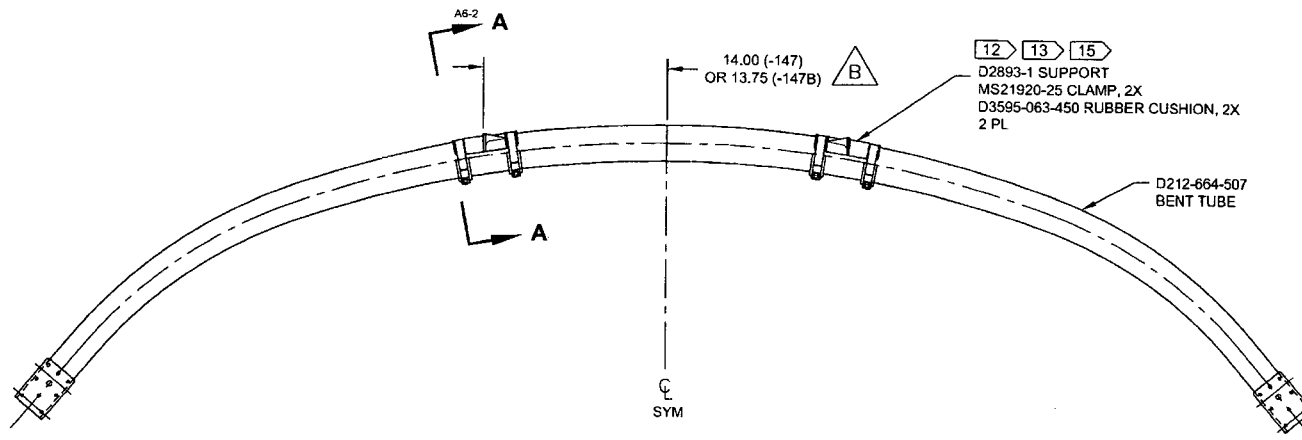
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

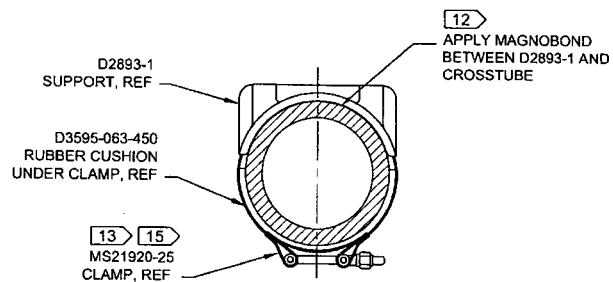
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**NOTE:** Date & initial all entries



**D212-664-147-147B**  
**ASSEMBLY DETAIL**



**SECTION A-A** D5-2  
SCALE 4X

W/O 66853

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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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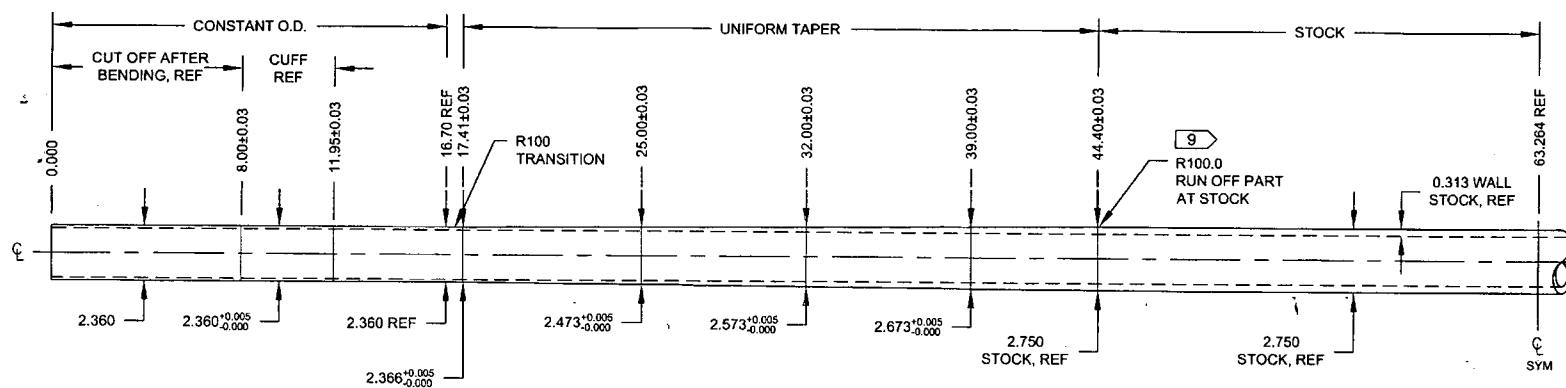
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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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**D212-664-147TRN**  
**TURNING DETAIL**

*u/b 66853*

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